Ecology, voice and territorial competition of two forest eagle owls, Fraser's Eagle Owl Bubo poensis and Akun Eagle Owl B. leucostictus

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L'écologie, les vocalisations et la compétition territoriale de deux grands-ducs forestiers, le Grand-duc à aigrettes *Bubo poensis* et le Grand-duc tacheté *B. leucostictus*. Cet article présente des observations de deux grands-ducs forestiers *Bubo* spp., provenant surtout du Congo et du Cameroun (1989–2001) mais aussi du Ghana, du Nigeria, de la Guinée Equatoriale et du Rwanda. Les aires de distribution du Grand-duc à aigrettes *Bubo poensis* (forme nominale) et du Grand-duc tacheté *B. leucostictus* se recouvrent largement, sauf que le premier atteint des altitudes nettement plus élevées. *B. poensis* fréquente surtout les lisières forestières, les forêts assez dégradées et ne s'observe que rarement en forêt primaire à voûte fermée. Il a un large spectre alimentaire (insectes et petits vertébrés), tandis que *B. leucostictus* est surtout ou même exclusivement insectivore. Ce dernier évite les milieux les plus dégradés et est l'espèce dominante des vieilles forêts secondaires ou forêts primaires sempervirentes (dont la voûte présente naturellement de petites ouvertures): c'est dans ce type de forêt que les deux *Bubo* peuvent entrer en contact.

Les émissions vocales les plus fréquentes de *B. poensis* sont des roulades courtes ou longues (jusqu'à plusieurs secondes), émises par des oiseaux seuls ou en duo. La forme vosseleri de Tanzanie produit de longues roulades identiques (Fig. 1). On entend aussi en saison des appels sifflés puissants et aigus, apparemment produits par des jeunes; ces sifflements n'ont aucune valeur agressive. Les émissions vocales les plus caractéristiques de *B. leucostictus* sont des appels bas, étouffés, courts et peu puissants (roh, roh . . .), émis par des oiseaux seuls (apparemment le mâle adulte), tandis que les couples peuvent chanter de concert des duos de roulades courtes, avec parfois un sifflement ascendant court. Ces roulades courtes sont en général un peu plus lentes que celles de *B. poensis* (plutôt un staccato), et au nord Congo et Cameroun adjacent il existe une variante dialectale particulière, où le second oiseau termine sa roulade par une double exclamation (kokokokok, ka-kâh!). On entend aussi (rarement) des appels sifflés longs, plus rauques et plus 'sinistres' que ceux de *B. poensis*, se rapprochant un peu des longs cris du Grand-duc de Shelley *B. shelleyi*. Il est probable, mais non encore prouvé, que ces longs sifflements soient le fait de jeunes oiseaux.

La repasse de la longue roulade de *B. poensis* est le moyen le plus efficace de provoquer une réponse agressive chez *B. poensis* comme chez *B. leucostictus*, mais ce dernier réagit avec ses vocalisations propres. Il semble que les deux espèces défendent des territoires interspécifiques là où elles entrent en contact, comme les distances observées entre individus des deux espèces dans un même type de forêt sont de l'ordre de 1 km ou plus. La prudence s'impose quant à l'identification d'un oiseau réagissant à cet enregistrement, mais la longue roulade n'a jamais été entendue chez *B. leucostictus*, et les notes rauques de ce dernier (*roh, roh, . . .*) jamais chez *B. poensis*. D'autres cas de 'countersinging' interspécifique chez des espèces congénériques ont été observés en Afrique.

Summary. Observations are presented from many encounters with two eagle owl species, mainly in Congo and Cameroon (1989–2001). The ranges of nominate Fraser's Eagle Owl *Bubo poensis* and Akun Eagle Owl *B. leucostictus* are fairly similar, except that the former extends to much higher altitudes. These large owls are partly separated by their ecological requirements (*B. poensis* preferring secondary situations, *B. leucostictus* old secondary or primary forest with small openings) and diet (*B. poensis* taking a range of insects and small vertebrates, *B. leucostictus* mainly or exclusively insects). However, they occasionally come into contact, especially in open-canopy semi-evergreen forest. The most frequent vocalisations of *B. poensis* are guttural trills (or purring

rattles), short or long (several seconds), given singly or in duet; the form vosseleri of Tanzania produces identical trills (Fig. 1). High-pitched, far-carrying modulated whistles are heard persistently at some times of year and circumstantial evidence suggests they are produced by immatures; they have no known aggressive or reactive purpose. The most characteristic call of B. leucostictus, always produced by single birds (apparently males), is a series of low, soft grunts roh, roh, . . . ; short, hoarse ascending whistles and short, slow trills are also given, singly or in duet. In northern Congo and south-east Cameroon at least, this duet has a distinctive dialectal variant, with the second bird producing a slow (staccato) trill ending in two exclamatory notes (kokokoko, ka-kah!). In Ghana however, duets heard were hard to distinguish from those of B. poensis (with short trills). Long whistles are also occasionally produced by B. leucostictus, but are somewhat lower pitched, hoarser and more 'sinister' than those of B. poensis; they tend to recall those of Shelley's Eagle Owl B. shelleyi. Tape playback of the long guttural trill of B. poensis (never produced by B. leucostictus) elicits strong reactions in B. leucostictus too, but species-specific vocal characters are preserved in interspecific reactions. It appears that both eagle owls may defend interspecific territories where they come into contact; distances measured between eagle owls of different species being 1 km or more. Interspecific countersinging is known in several other pairs of congeneric species in the African tropics.

hilst undertaking systematic searches for forest nightjars *Caprimulgus* spp. in northern Congo in 1997 (Dowsett-Lemaire & Dowsett 1998a) we also played a few tapes of owls, including the long guttural trill or purring rattle of Fraser's Eagle Owl *Bubo poensis* (last motif in Chappuis 1978). This was done along a narrow, 25 km-long track crossing broken-canopy semi-evergreen forest in Nouabalé-Ndoki National Park. We located eight territories of *Bubo* species along this track (three of *B. poensis*, five of Akun Eagle Owl *B. leucostictus*), and it was soon obvious that both species were equally interested in tape playback of *B. poensis*.

This note assembles various observations on the ecology and vocal behaviour of both *Bubo* species, collected mainly in Congo-Brazzaville and Cameroon over a period of 12 years (1989–2001). Other observations come from Ghana (2004–05), south-east Nigeria (1988), Equatorial Guinea (1998) and Rwanda (1989–90). Unlike other forest owls of the genera *Glaucidium*, *Scotopelia* and *Jubula*, these two *Bubo* are rather bold: either spontaneously or when responding to playback, they do not hesitate to expose themselves in full view on large branches, facilitating positive identification. It has thus been possible to learn something of their vocal behaviour and interactions.

Distribution

B. poensis. Nominate B. poensis is somewhat more widespread than its congener, occurring through-

out the Guineo-Congolian region (including Bioko), from Sierra Leone and Guinea to Ghana, and Nigeria to western Uganda and northern Angola (Kemp in Fry et al. 1988, Dowsett & Forbes-Watson 1993, Demey & Rainey 2004). It covers a wide altitudinal range, up to 2,200 m in Cameroon (Mt Oku: Dowsett-Lemaire & Dowsett 1998b) and up to at least 2,000 m in Nyungwe Forest in Rwanda (Dowsett-Lemaire 1990) and 2,100 m in south-west Uganda (Friedmann & Williams 1968). Another form, B. p. vosseleri, is widespread in the forests of Tanzania, from the Usambaras (Evans et al. 1994) and South Pare (Burgess et al. 1998), south to the Ulugurus (Hunter et al. 1998) and Udzungwa Mountains (Butynski & Ehardt 2003); the overall altitudinal range is at least 200-1,700 m. The Tanzanian form is often considered a separate species, Usambara or Nduk Eagle Owl B. vosseleri, but recent vocal evidence supports conspecific treatment (see below). Nominate B. poensis is a Guineo-Congolian near-endemic, extending to high altitudes in Cameroon and the Albertine Rift, whereas B. poensis sensu lato belongs to two Guineo-Congolian and (Dowsett-Lemaire & Dowsett 2001), with Afromontane intrusions.

B. leucostictus. This is a Guineo-Congolian endemic with much the same horizontal distribution as nominate *B. poensis*, except that it does not appear to reach East Africa. It is much more

restricted in altitude, as it is known only from low-land forest. Altitudes are generally not given in the literature (e.g. Fry et al. 1988). My own records are from near sea level to only 600 m (Congo, Odzala) and 500 m (south-east Cameroon), whereas I heard it to 700 m in Ghana (Atewa range). In particular, it appears to be completely absent from montane western Cameroon, with firm records in the west only from very low altitudes, in Korup National Park, Yabassi and the Campo area (Important Bird Areas CM019, CM026 and CM031 in Fishpool & Evans 2001). At Yabassi (near Yingui), my single record was just below 500 m.

Ecology

B. poensis. All general works seem to agree that this species is rather unspecialised, being frequently found in secondary situations (e.g. at forest edges or in farmbush, early stages of forest regeneration, old secondary forest) and much more rarely in the heart of primary forest (e.g. Brosset & Erard 1986). My 27 personal encounters with the species were in the following habitats:

- gardens and farmbush some way from forest edge: two (Cameroon, Congo);
- ecotone between forest and cultivation/farmbush: nine (Ghana, Cameroon, Equatorial Guinea, Congo, Rwanda);
- edge of old secondary forest along roads: five (Ghana, Cameroon, Congo);
- edge of primary forest giving onto large natural clearing (salt-pan): one (Lobéké in Cameroon);
- mosaic of forest patches and savanna: two (Bakossi Mts in Cameroon, Kyabobo in Ghana);
- inside selectively (moderately) logged forest: two (Congo);
- inside primary or near-primary forest with a naturally broken canopy, either semi-evergreen (Nouabalé-Ndoki in Congo) or Afromontane (Nyungwe in Rwanda): five;
- inside closed-canopy evergreen forest: one (Oban Hills, Nigeria).

Prey choice seems to be very wide in this species, ranging from insects to frogs, birds, small mammals (Bates 1930, Chapin 1939) and 'also occasionally fruit' (Kemp *in* Fry *et al.* 1988, source

untraced); in a Kupe garden a B. poensis also captured several tortoises in an open terrarium (C. Wild pers. comm.). Playback of the purring calls of this owl often elicits vocal responses in other species, apparently through alarm: Demidoff's Galago Galagoides demidoff (frequently), Guereza Colobus Colobus guereza, and also apparently once among a group of roosting Plumed Guineafowl Guttera plumifera and in a small owl, Sandy Scops Owl Otus icterorhynchus (pers. obs. in Cameroon and Congo). Similarly Butynski & Ehardt (2003) noticed that dwarf galagos Galagoides spp. reacted strongly to the calls of B. p. vosseleri in the Udzungwas of Tanzania, 'by giving long series of alarm and other calls,' and relate this behaviour to that of potential prey.

- *B. leucostictus.* Data on the habits of this owl are more scanty. In Gabon Brosset & Erard (1986) consider that it is probably more a bird of very old secondary forest, found overall in more developed stages of forest regeneration than *B. poensis.* My 21 personal observations were in the following habitats:
- edge of old secondary forest along roads: two (Congo);
- in open canopy of selectively logged forest: four (Ghana, Congo);
- in a small natural clearing (salt-pan) with scattered trees, in the middle of primary forest: one (Nki in Cameroon);
- in (almost) untouched semi-evergreen forest, with naturally open canopy: 14 (Congo, Cameroon). This includes six observations near a small track in Nouabalé-Ndoki National Park (Congo), where the track was rather overgrown and no wider than 2–3 m. The other eight observations were in untouched (unlogged) forest, mainly in Odzala National Park and Nouabalé-Ndoki National Park in Congo, also at two sites in south-east and western Cameroon.

Food-wise, although slightly larger than *B. poensis*, this owl seems to be essentially insectivorous, which Bates (1930) and Chapin (1939) tentatively attributed to its weak-footed structure and small bill. All stomach contents of specimens contain exclusively insects, although a captive bird accepted oil-palm fruits and once nibbled leaves of a Flamboyant tree *Delonix regia* (Jellicoe 1954). In

Gabon, Brosset & Erard (1986) noted that a captive immature accepted only large insects and refused small vertebrates. Jellicoe (1954) observed similar behaviour in her captive, but it did swallow pieces of rodent if previously chopped up. Beyond the age of six months, it managed to break up a whole dead rat by dragging and 'walking' on it, but this and the process of eating it might take the whole night. If 'accidentally given a rat that was not quite dead, the bird appeared terrified of the slight movement' (Jellicoe 1954: 160). Bates (1930) saw one catching cockroaches in the air; in southern and northern Congo I observed birds in moonlight flycatch on the edge of a small track. Chappuis (1978) saw one flycatching in Côte d'Ivoire. I have never noticed reactions of fear among small mammals or other bird species near a calling B. leucostictus.

To summarise, despite the fact that R. J. Dowsett and I camped more often at forest edges than inside forest, there is no doubt that *B. poensis* is more often encountered in secondary situations (even gardens) than its congener; the main habitat of *B. leucostictus* is probably old secondary and primary forest, provided the canopy is somewhat open (naturally or through selective logging). On the other hand, it seems that *B. poensis* is only exceptionally encountered in closed-canopy primary forest: my single record in such habitat (Oban Hills, Nigeria) is based on a bird giving the high whistle all night long, probably an immature (see below). We were miles away from the edge of the forest, having become lost for two days. In

south-east Cameroon and at Yabassi in the west, we spent many nights inside primary forest on walking expeditions: by far the main *Bubo* species encountered was *leucostictus*, the only contact with *B. poensis* being on the edge of a very large salt pan (Lobéké). The two species were nevertheless observed in relatively close proximity in the Mayombe of Congo (old secondary forest at road edges) and in semi-evergreen forest in Nouabalé-Ndoki National Park.

Voice

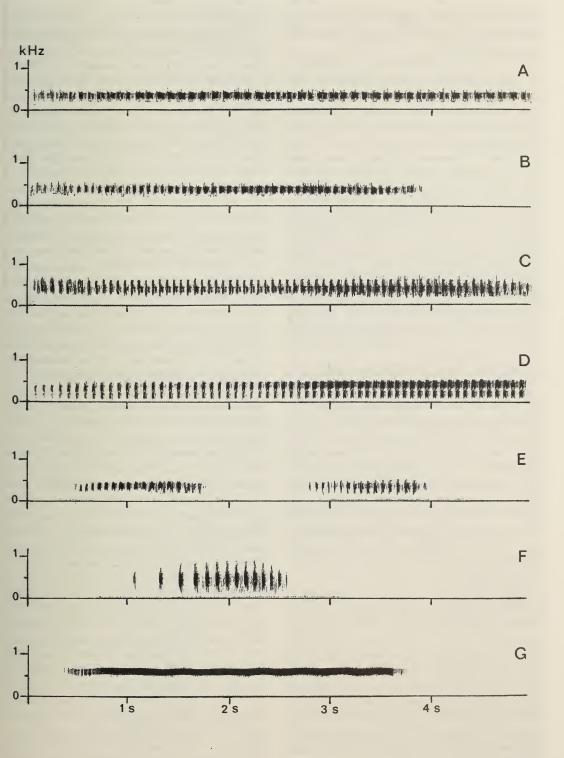
The voice of both species is rather varied, with calls falling into two main categories: whistles and low-pitched guttural trills. In addition *B. leucostictus* frequently produces a short grunt which has no equivalent in its congener.

B. poensis. The most frequently heard calls are guttural trills (also called purring or grunting trills, as in Borrow & Demey 2001); they can be given in isolation or by pairs in duet. They are the 'roulades' in Chappuis (1978, 2000). Unprovoked pairs often call to each other softly korororororo, kororororo, each call lasting 1-2 seconds (Fig. 1E). Birds can give longer trills under certain circumstances, and usually do so when provoked by playback. These long trills can again be given by isolated birds as well as in duet; they last several seconds (often 3-5) and are somewhat modulated in pitch or volume. Examples are illustrated in Fig. 1, B and C belonging to two members of a pair reacting to playback, one starting to call before the other finished; they show some individual varia-

Captions to figures on opposite page

Figure 1. A–E: sonograms of guttural trills of Fraser's Eagle Owl *Bubo poensis*, including Usambara Eagle Owl *B. p. vosseleri* (Tanzania): A: Uluguru Mountain, Tanzania (tape-recorded in November 1995 by C. Carter); B and C: Nyungwe Forest, Rwanda (produced by both members of a pair, tape-recorded by FD-L in November 1989 on Sony TCM-150 cassette recorder, modified by Mineroff, with Beyer Dynamic microphone and parabolic reflector); D: captive bird held in Antwerp Zoo, Belgium (from Chappuis 1978); E: pair duetting in Côte d'Ivoire (from Chappuis 1978). F: short, slow trill (staccato) produced by Akun Eagle Owl *B. leucostictus*, Côte d'Ivoire (from Chappuis 1978); G: high whistle of (presumed) immature *B. poensis* (Nyungwe Forest, Rwanda, January 1990, tape-recorded by FD-L). Sonograms produced on a Kay Electric Sonagraph 7029A, using wide band filter.

A-E: sonogrammes de roulades du Grand-duc à aigrettes *Bubo poensis*, y compris la forme *B. p. vosseleri* de Tanzanie: A: Uluguru Mountain, Tanzanie (enregistré en novembre 1995 par C. Carter); B et C: Forêt de Nyungwe, Rwanda (roulades produites par les deux membres d'un couple et enregistrées par FD-L en novembre 1989, avec un enregistreur-cassette Sony TCM-150 modifié par Mineroff, et un microphone Beyer Dynamic centré sur parabole); D: oiseau captif du zoo d'Anvers (enregistrement publié par Chappuis 1978); E: duo d'un couple en Côte d'Ivoire (tiré de Chappuis 1978). F: trille (staccato) du Grand-duc tacheté *Bubo leucostictus* (Côte d'Ivoire, tiré de Chappuis 1978); G: sifflement pur d'un *B. poensis* (probablement un immature, Rwanda, janvier 1990, enregistré par FD-L.). Sonogrammes produits avec un spectrographe Kay Electric 7029A, en bande large.



tion. Playback attracted these birds to within 3–4 m of the car, on which the recorder was resting; at one point one bird was on one side of the car, and its mate on the other.

Two young birds fledged in the same territory in Nyungwe Forest, Rwanda, in December 1989, a month after I recorded the adults: they produced high-pitched, thin weeeu whistles, whilst the adults were rattling in duet nearby. A month later, when camping at exactly the same spot, all I heard was a pure, drawn-out, powerful, eerie whistle (Fig. 1G, as in cut one in Chappuis 1978, 2000), given almost all night long without interruption at a mean rate of two whistles per minute. This bird was joined by another, producing the same type of whistle, in the middle of the night. Although I assumed at the time (Dowsett-Lemaire 1990) that these were produced by the adult pair, it seems far more likely they were produced by the immatures; they were no more than a louder, slightly longer version of the whistle produced by the fledglings. Playback of this vocalisation did not produce any reaction. I have heard this eerie, powerful whistle in several places (Nigeria, Congo, Ghana), sometimes close to a pair of adults producing a duet of trills, i.e. the whistling bird is clearly tolerated by the territorial pair, which again suggests the whistles come from a young bird. On other occasions, the whistle was produced in isolation, often all night, but this bird or others present never reacted to playback, not even to the aggressive trill call. In Ghana in particular, two trials of playback in late December and January near whistling birds together with trilling birds (presumably a family) did not provoke an aggressive reaction, which suggests that the breeding cycle was far enough advanced that the adults had entered a period of territorial rest.

As in other owls, *B. poensis* is most vocal *c*.1 hour after dark (presumably after the first bout of feeding), though some short trills can be given long before that, in late afternoon and around dusk. Birds also call at other times in the night, and until just before dawn. The persistent long whistles of presumed immatures are often heard all night, shortly after dusk until dawn. Adults do not call every night: at any camp near an occupied territory it is indeed usual to hear vocal activity on only one of three or four nights, or even a single night in a week. Tapes have been played at known spots without reaction, either because the pair had

moved slightly or because they had entered into a rest phase.

The form vosseleri from Tanzania is not as well known but it produces guttural trills identical to those of nominate poensis (compare Fig. 1A with 1B recorded in Rwanda). Until C. Carter obtained a good tape-recording in the Ulugurus (Hunter et al. 1998) it had been difficult to interpret the written descriptions of this owl's calls (as in Olney 1984, Evans et al. 1994). A copy of Evans's tape from the Usambaras is virtually inaudible. Olney, who observed them in captivity mentioned 'a repeated (three or four times) regular double syllable' and Evans et al. 'bursts of wubbering notes.' Carter's tape put an end to the mystery, and indeed by playing my tape of the duetting pair of nominate B. poensis from Rwanda, he was able to bring the Uluguru bird closer whilst a second was also stimulated to call. Butynski & Ehardt (2003) heard many similar guttural trills ('loud purring') in the Udzungwas; they also remarked that high whistles have not yet been heard in this form, but the limited field observations are insufficient to prove that they do not exist, and surely immatures are likely to produce a call differing from the adult trills.

The trills of members of a pair of *B. poensis* show some individual variation, probably sexual. The structure of the notes in one bird is a little more square, less narrow and high than in its mate; these structural differences appear clearly in the duet recorded in Rwanda (Fig. 1B, C) and appear again in another duet recorded in Côte d'Ivoire (Fig. 1E). If indeed they are sexually based, the main bird recorded by C. Carter in the Ulugurus (Fig. 1A) was presumably of the same sex as B, and the captive bird recorded in Antwerp (nominate *poensis*, Fig. 1D) of the sex of C.

B. leucostictus. This species overall appears less demonstrative and noisy than B. poensis, but vocalisations are quite varied. By far the most frequent and characteristic call is a low-pitched short grunt roh, roh, roh... repeated at intervals of a few seconds (presented in cut one in Chappuis 2000). I heard it on 14 of my 21 encounters with the species, usually unprovoked by playback (but see below). This has never been heard in B. poensis and appears to be the most reliable call for species identification. It is produced by a single bird, even if a mate is present. There is specimen evidence that the bird responsible is the male, as A. Forbes-

Watson in Liberia (*in* Colston & Curry-Lindahl 1986) collected a male after following it for some time, and the bird was giving 'a deep, measured soft grunting *hu* (2 sec interval).' As Forbes-Watson remarked, it does not carry very far. I measured a distance of audibility of barely 500 m, in an area of fairly open-canopy forest (Congo). The call can be produced over long periods of up to an hour, just after dusk and at any time during the night until almost dawn. This most distinctive call was not described by Kemp (*in* Fry *et al.* 1988).

B. leucostictus also produces short trills, sometimes very similar to B. poensis but usually slower (then more staccato than a trill, Fig. 1F); they usually last c.1 second. I have never heard a long trill like that of B. poensis. One bird I watched in full view on a dead tree in Congo started with a low, hoarse ascending whistle whoooee followed by several short, soft staccato trills kokokokokok; it then continued with a series of grunts roh, roh . . . for at least 40 minutes. These staccato notes and hoarse whistles are all presented by Chappuis (1978, 2000). Duets exist but consist only of the short staccato trills. I have heard duets of staccato trills in six pairs (Congo, Cameroon and Ghana). In northern Congo and south-east Cameroon, several pairs observed in moonlight with powerful torches produced duets of staccato kokokoko, kokoko ka-kah, the first being close to a slow version of a B. poensis trill, the second (by the female?) ending in a most distinctive double exclamation (heard throughout Nouabalé-Ndoki in Congo, Boumba-Bek and Nki in south-east Cameroon). In Cameroon, one member of a pair preceded the slow trills by series of woff, woff, woff. ... A sort of bark can also be heard in an excited (or alarmed) bird. In Ghana, the duets heard in two places consisted of faster trills nearly identical to poensis, but eventually one bird switched to the typical deep grunt roh, roh, roh. . . . Some duets are produced spontaneously, others provoked by playback, thus there is no doubt that they have territorial value. Neither the roh calls nor the slow trills are given every night; as in B. poensis, they may be heard on one of several evenings or nights, or just once in a week.

High-pitched whistles have been heard twice in Congo (Mayombe at Goumina, Odzala National Park), with one bird eventually seen well. These differ from *B. poensis* by being noticeably hoarser in tone, lower pitched and rather 'sinister': eehooooooh, lasting 2–3 seconds with a slight drop in pitch at the end. They are intermediate between the high, powerful whistles of (presumably) immature *B. poensis* and the dismal screams taperecorded in a captive Shelley's Eagle Owl *B. shelleyi* from Liberia (in Chappuis 1978, 2000). One bird tape-recorded in the Mayombe was answered by another with a short, hoarse whistle. The night before, all I had heard in the area was the distinctive *roh*. Possibly this call is—by analogy with *B. poensis*—produced by immatures, but why it seems to be given so rarely is unknown.

To conclude, vocalisations of *B. poensis* carry further afield than those of *B. leucostictus*, especially the high-pitched whistles of presumed immatures. These whistles do not seem to have any territorial value. The most characteristic call of *B. poensis* is the long guttural trill (several seconds duration), while that of *B. leucostictus* is the low grunt *roh*. Both species give short trills or staccato trills, singly or in duet, and it is not always easy to attribute them to species.

Tape playback and interspecific reactions

B. poensis. This species reacts well to playback of short or long trills, but was never observed (so far) to react to playback of high whistles. Playing the long trill from Chappuis 1978 (Fig. 1D, obtained in a captive bird) can elicit pairs to answer with a duet of short or long trills, and isolated birds also answer with long trills. Similarly, a positive reaction was obtained with *B. p. vosseleri* from Tanzania by playing a duet of trills of *B. poensis* from Rwanda (Hunter *et al.* 1998).

- *B. leucostictus.* None of the usual vocalisations carries very far, and practice taught me that the best way of locating this owl on a silent night is by playing the long trill of *B. poensis* (last cut in Chappuis 1978). The following experiments were carried out.
- 1. Mbeli Camp in Nouabalé-Ndoki National Park, Congo, April 1996. Small clearing in primary semi-evergreen forest. No owl calling. Playback of long *B. poensis* trill provoked a vocal reaction in the local pair of *B. leucostictus* within seconds: pair started duetting with brief staccato trills, second bird ending with a double exclamation, thus *kokoko*, *ka-kah!* (birds well seen in strong torchlight).

- 2. Nouabalé-Ndoki National Park, 25 km of track from near Bomassa to Ndoki, April-May 1997. Systematic searches for nightjars were carried out in the second half of the night (Dowsett-Lemaire & Dowsett 1998a). The B. poensis tape was played on seven of eight nights, but not at every stop (through lack of time); distances were measured with the car odometer. Three initially silent individuals replied to playback of B. poensis trills with a series of low grunts roh, roh. . . . A fourth bird was uttering this call spontaneously and playback of the B. poensis rattle provoked it into a short staccato kokokokoko. The fifth bird was also calling spontaneously; the roh, roh call was tape-recorded and played back, but this did not produce much reaction (more grunts at the same distance). Three B. poensis were also located along this track; locations of either species of Bubo were from one to several kilometres distant. The highest concentration was one B. leucostictus followed by a B. poensis just under 1 km further, followed by a B. leucostictus 1 km further. The other two B. poensis were many kilometres away from the nearest B. leucostictus.
- 3. Boumba-Bek, south-east Cameroon, December 1997. Playback of *B. poensis* trill provoked a pair of *B. leucostictus* to answer, first by a short loud bark (in alarm?), then a duet of staccato kokokoko, kokoko ka-kah!
- 4. Nki Forest, south-east Cameroon, January 1998. Small natural clearing (salt-pan) with scattered trees, in the heart of primary forest. We camped for five nights at this spot. No Bubo spp. called on the first night; the second evening I played the long trill of B. poensis: a pair of B. leucostictus immediately perched on a bare branch of a large tree and, after one or two woff-woff, answered with the usual duet of staccato trills, ending in ka-kah! On the third evening, one bird was grunting (roh, roh . . .), without prompting, just after dusk. On the fourth evening, the pair was flying around the clearing, from tree to tree, uttering series of wof-wof-wof-wof... and occasional brief staccato notes; they were quite visible, as the night was clear, with half moon. They were quiet on the fifth night. This demonstrative behaviour gave the impression that it had taken them three nights to make quite sure that the 'intruding' B. poensis had been scared far away.

Discussion

There is no doubt that the long aggressive trill of B. poensis is well understood by B. leucostictus; many pairs or individuals of the latter react to it with their own typical vocalisations, low grunts or short staccato trills (usually in duet if both members of the pair are present). B. leucostictus has never been heard producing the long trill even when clearly reacting to the B. poensis tape (as above). Species-specific characters are preserved in interspecific reactions. Despite these two eagle owls being partly separated by their ecological requirements, by diet and certainly by altitude in montane regions, they come into competition in several places, particularly in semi-evergreen forest with an open canopy, or in lightly logged forest. In two places in the Mayombe, I had both species within 1 km or slightly less of each other. In Nouabalé-Ndoki, the interspecific distance was of the order of 1 km or more. Playback experiments and direct observations of localised individuals suggest that they maintain separate territories. However, these birds do not call every night, limits of territories are difficult to define in nocturnal species, and further observations are required to establish whether territories are totally exclusive of those of congeners.

Interspecific countersinging between congeneric species is an uncommon phenomenon in the African tropics, but is used persistently between certain species pairs. One common example is that of Yellow-billed Tauraco macrorhynchus and Green Turacos T. persa, where they meet in Gabon and Congo. They defend interspecific territories through countersinging, i.e. the song of one provoking a vocal response in the other (Brosset & Erard 1986, Dowsett-Lemaire 1997). In the forests of northern Malawi, three species of apalis warblers defend interspecific territories through countersinging, keeping separate territories either horizontally (Grey Apalis Apalis cinerea and Chestnut-headed Apalis A. chapini), or vertically (Bar-throated Apalis A. thoracica, with A. chapini above it): Dowsett-Lemaire (1989). In parts of northern Ghana, Red-winged Warbler Heliolais erythropterus and Tawny-flanked Prinia Prinia subflava occur in high densities side by side in open woodland, and have been heard countersinging on numerous occasions (pers. obs., 2004-05); they seem to maintain (at least partially) exclusive territories, at least at the peak of the rainy season if not in the dry season (when seen closer to each other). These two warblers have sometimes been placed in the same genus; they appear to compete where *Heliolais* is particularly common. In Malawi where the latter is more local, I had not noted this type of interaction. In all these cases, as in the *Bubo* species, each bird uses its own species-specific vocalisations and evidently learns to recognise the other species's song through competition.

One more case of interspecific countersinging involves two small forest batises, Verreaux's Batis Batis minima and Bioko Batis B. poensis. In northern Congo (where I never found B. minima), the tape of B. minima often provoked B. poensis into song, and in Equatorial Guinea (where both occur: Dowsett-Lemaire & Dowsett 1999), B. minima readily reacted to B. poensis. However, this problem is complicated by the fact that their songs are rather similar, even sometimes identical, and Erard (in Urban et al. 1997: 599) observed countersinging in Gabon where 'they seem to copy one another when they meet'!

Finally, a word of caution: since playback of a tape-recording of *Bubo poensis* is equally likely to call up a *B. leucostictus*, observers should ascertain which species is responding, and with what type of call it responds. A short trill is perhaps insufficient to identify the species with certainty, but short grunts *roh*, *roh* are the signature tune of *B. leucostictus*, whereas a long guttural trill is that of *B. poensis*.

Acknowledgements

I am grateful to L.D.C. Fishpool for providing some references and C. Carter for sending me a copy of his tape from the Uluguru Mountains. N. Borrow, H. Rainey and P. Steyn commented on a draft of this paper.

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Received 2 January 2006; revision accepted 2 June 2006

Appendix. Gazetteer of some localities cited.

Annexe. Coordonnées de certaines localités citées.

Atewa Range, Ghana	06°14'N	00°34'W	Nouabalé-Ndoki NP, Congo	02°20'N	16°30'E
Bakossi Mts, Cameroon	05°00'N	09°40'E	Nyungwe Forest, Rwanda	02°26'S	29°10'E
Boumba-Bek, Cameroon	02°40'N	15°00'E	Oban Hills, Nigeria	05°35'N	08°20'E
Goumina, Mayombe of Congo	04°08'S	12°07'E	Odzala NP, Congo	00°30'N	14°45'E
Kyabobo, Ghana	08°25'N	00°36'E	Oku Mt, Cameroon	06°10'N	10°30'E
Lobéké, Cameroon	02°15'N	15°45'E	Yabassi (Yingui), Cameroon	04°30'N	10°20'E
Nki, Cameroon	02°20'N	14°30'E			

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